

REMARKS

Claims 1- 16 remain pending in this application. Claims 7 - 16 were withdrawn from consideration. The objections and rejections set forth in the Office Action are respectfully traversed below.

Claim Objections and Rejections Under 35 U.S.C. §112, Second Paragraph:

The claims were amended above to correct the minor errors identified in the claim objections and rejections under 35 U.S.C. §112, second paragraph.

The Office Action alleged that the phrase "that can be anisotropically etched" is not a positively claimed feature. This is incorrect. Claim 1 recites "a material that can be anisotropically etched." This is a positively claimed material characteristic for the posts.

The Office Action alleged that the recitation of an insulative substrate was confusing. It is submitted that there is no confusion. Claim 1 specifically recites "a front-and-back electrically conductive substrate" that includes both the plurality of posts, as well as, "an insulative substrate." It is clear that the front and back electrically conductive substrate according to the present invention includes an insulative substrate. There is no confusion.

The Office Action alleged that the phrase "the insulation material . . . that absorbs a difference in a CTE" was not understood. It is submitted that one of ordinary skill in the art would clearly understand this claimed feature. Claim 6 clearly recites the use of a material that absorbs, takes up, or compensates for the CTE mismatch between the insulation material and the mounted semiconductor components.

Rejections Under 35 U.S.C. §103:

Claims 1 - 6 were rejected under 35 U.S.C. §103 over **Shaheen et al.** (USP 3,571,923) in view of **Hawkins et al.** (USP 6,258,286). However, it is submitted that nothing in the prior art, either alone or in combination, teaches or suggests all the features recited in the present claimed invention.

For instance, nothing in the prior art, either alone or in combination, teaches or suggests the claimed plurality of posts composed of a material that can be anisotropically etched. As identified in the Office Action, **Shaheen** discloses posts composed of a material made of copper or copper alloy. However, copper or copper alloys cannot be anisotropically etched, as required in the present claimed invention. The Examiner apparently recognizes this by acknowledging that "**Shaheen** does not disclose an anisotropically etched process."

The further reference to **Hawkins** was made for allegedly disclosing the motivation to modify **Shaheen** to use an anisotropically etched process (as disclosed in **Hawkins**) to form the claimed posts using the copper or copper alloy posts disclosed in **Shaheen**. As stated by the Examiner "it would have been to one of ordinary skill in the art at time of the invention was made to have an anisotropically etched as taught by **Hawkins** to employ the etching process of **Shaheen** for purpose of providing through holes aligned with bore liners, and also removing cavity masks in the through holes." These statements by the Examiner reflect a fundamental error.

In particular, the plurality of posts recited in the present claimed invention are made of a material that can be anisotropically etched. This is described by way of Figure 2 (*see e.g.*, posts

21 made of a silicon material). The present invention reflects a fundamental difference from conventional methods of forming such posts. **Shaheen** discloses the conventional method of forming through holes which are subsequently filled with electrically conductive materials (such as copper or copper alloys). On the contrary, the present invention reverses such conventional technology and forms posts from anisotropically etchable materials (such as silicon). Such posts are formed *without forming through holes*. The structural and material characteristic recited in the claimed invention is that the posts are made of a material that can be anisotropically etched. Conventional through-hole filled posts do not use anisotropically etched materials since the holes are created first and then filled with electrically conductive materials, such as the copper or copper alloys used in **Shaheen**. Such conventional through-filled posts are contrary to the present claimed invention and actually **teach away** from the present claimed invention.

Furthermore, the teachings of **Hawkins** to use anisotropic etching cannot be applied to the teachings of **Shaheen** to provide for the present claimed posts composed of a material that can be anisotropically etched. Indeed, both **Shaheen** and **Hawkins** **teach away** from the present claimed invention, since neither discloses posts composed of a material that can be anisotropically etched, and instead, focuses on forming through holes in a substrate that is then filled with an electrically conductive material. For at least these reasons, the present claimed invention patentably distinguishes over the prior art and the prior art rejections should be withdrawn.

The dependent claims distinguish over the cited prior art for at least the reasons independent claim 1 distinguishes over the prior art.

With regard to claim 5, the Office Action relied on a prior art reference "Don." However, there is no indication in the Office Action as to what the "Don" reference is. For at least this further reason, the rejection of claim 5 is improper and should be withdrawn.

The Office Action also included claim 6 in the rejections under 35 U.S.C. §103, but failed to explain how any of the cited prior art teaches or suggests the further limitations recited in claim 6. Therefore, the rejection of claim 6 under 35 U.S.C. §103 is improper and should be withdrawn.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,
ARMSTRONG, WESTERMAN & HATTORI, LLP



John P. Kong
Attorney for Applicant
Reg. No. 40,054

JPK/kal
Atty. Docket No. **010153**
Suite 1000, 1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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Enclosures: Version with markings to show changes made



AMENDMENT UNDER 37 CFR §1.111

U.S. Patent Application Serial No. 09/783,598

VERSION WITH MARKINGS TO SHOW CHANGES MADE 09/783,598

IN THE CLAIMS:

AMEND claims 1 4, 5, and 6 to read as follows:

1. (AMENDED) A front-and-back electrically conductive substrate comprising:
a plurality of posts composed of a material that can be anisotropically etched and each of the posts having an electrically conductive portion that has at least a first surface and a second surface that communicate with each other; and
an insulative substrate that supports the plurality of posts.
4. (AMENDED) The front-and-back electrically conductive substrate as claimed in claim 1, [wherein] further comprising a pad for mounting a semiconductor component [is] formed on at least the first surface of the front-and-back electrically conductive substrate.
5. (AMENDED) The front-and-back electrically conductive substrate as claimed in claim 1, [wherein] further comprising a thin film composed of a wiring pattern layer and an insulation layer [is] formed on at least the first surface of the front-and-back electrically conductive substrate.
6. (AMENDED) The front-and-back electrically conductive substrate as claimed in claim 1, wherein the insulation material of the insulative substrate includes a material that

absorbs a difference in a coefficient of thermal expansion between the insulation material and a
mounted semiconductor component[s].